

RESEARCH ARTICLE

Knowledge and Perceptions about Cancer Treatment-associated Infertility among Young Patients at a Tertiary Care Hospital in Pakistan

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Abstract

Introduction: Infertility after cancer treatment can cause significant emotional stress and grief for cancer survivors. In this study we assessed knowledge and perceptions among young cancer patients regarding the topic of cancer and infertility related to different treatment options. **Material and Methods:** This cross-sectional study was conducted on young cancer patients in the Clinical Oncology Department, JPMC, Karachi, from January to August 2013. Patients were requested to fill in questionnaires. Comparisons between gender and age groups were performed using the Student's t test and Pearson's Chi-squared. Significance was concluded with a two tailed p-value less than 0.05. **Results:** The survey included 368 cancer patients, 194 males and 174 females. Ninety percent of respondents of either gender were not aware that cancer or cancer treatment can cause infertility, this being age dependent ($P=0.06$). However, on being made aware, 98% of males and 91% of females wanted their oncologist to discuss treatment-related infertility prior to initiating cancer treatment ($P=0.005$) and 92% and 78%, respectively, wanted to consider fertility preservation techniques prior to treatment ($P<0.0001$). Of age groups 15-30 years and 31-50 years, 91% and 81% wanted to consider FP prior to cancer treatment ($P=0.011$). Among 226 married individuals, 89% males and 79% females underestimated that effects that infertility issues might have on their relationships with their spouses. **Conclusions:** We recommend physicians and oncology care givers to initiate discussion of the topic of cancer and treatment-related infertility with young cancer patients during their initial management planning.

Keywords: Fertility preservation (FP)- infertility- cancer treatment

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Introduction

Cancer can affect fertility by multiple ways, either directly by involving re-productive organs, or indirectly by suppressing reproductive function and by delaying reproduction because of its treatment (Carter et al., 2005; Dellapasqua et al., 2005). Due to advances in medical technologies over the past few decades, pediatric and adult cancer survival rates have improved remarkably, focusing on improving quality of life of survivors. One of side effect of its treatment that adversely affects the quality of life is the potential of having infertility or sterility (Reebals et al.,2006) . Some cancers and their treatment may compromise fertility in patients of either gender (Sonmezer et al.,2006). Although fertility challenges in men with cancer are far less complex than women, the specific risk of infertility varies by site and stage of cancer, its treatment type, and respective age of the patient (Lee et al.,2006).

The vast majority of chemotherapeutic agents are

gonadotoxic. Similarly, detrimental effects of radiotherapy depend on dose and area of irradiation field. Radiation therapy to the pelvis can have a direct negative impact on ovarian and uterine function by altering vascular supply and by reducing its growth if treatment is received during childhood (Meirow et al., 2001) . On the contrary in males, testicular cancer and systemic therapy for Hodgkin's lymphoma has known to cause damage to sperm DNA for up to 2 years after completion of treatment. (Lee et al.,2006).

Cancer survivors have reported interest in having children and believe that their cancer diagnosis will make them better parents (Schover et al.,1999). Infertility after cancer treatment can cause emotional stress and grief among survivors (Lee et al.,2006). The 2006 American Society of Clinical Oncology (ASCO) Recommendations on Fertility Preservation in Cancer Patients advises that all oncologists seeing patients of childbearing age should address potential treatment-associated infertility with patients, or parents of pediatric patients. The guidelines

also suggest oncologists should be able to answer basic questions about FP options, and refer patients to reproductive specialists and psychosocial providers as needed.

Lee et al., (2006) reports that physicians don't know how important FP is to patients unless they ask them, since many patients do not bring up the topic. Despite of these guidelines, the distress that infertility can cause in patients, recent studies showed the rate of FP discussions by health care providers, including oncologists, with patients, is quite infrequent and unfortunately not occurring on a regular basis as expected (Goodwin et al., 2007, Vadaparampil et al., 2008 and Clayton et al., 2008).

In this study we sought to determine knowledge and perception among young cancer patients on the topic of cancer and its treatment related infertility.

Materials and Methods

This cross sectional study was conducted from January 2013 to August 2013. It was Conducted on young cancer patients falling in the age group between 18 to 50 years visiting the outpatient clinics and admitted as inpatient in the Department of Clinical Oncology, Jinnah Postgraduate Medical Center, largest government based tertiary care center, in Karachi, Pakistan. Department of clinical oncology is one of the Busiest of these departments involved in catering cancer patients with diverse social background coming from different strata of community all over the country, and also from Afghanistan and Iran. An ERC (Ethics Review Committee) approval was taken. After informed consent, the responses were assessed on a printed questionnaire. All cancer patients were requested to fill the questionnaire which was in English and urdu language for the patient's convenience.

All respondents had an understanding of these languages for answering the questionnaire. The respondents belonged to different races and diverse familial backgrounds. People who refused to consent for participating in the study were excluded.

Statistical analysis Data pertaining to 368 patients were analyzed. Statistical Package for Social Sciences (SPSS) version 17 was used to perform data analysis which was reported percentages for categorical data. Age was collected as continuous but later categorized as between 15 to 30 years and 30 to 50 years.

Comparisons between gender and age groups were performed using Student t test and Pearson Chi-square according to the variables type and distribution. Significance level was established as a two tailed p- Value less than 0.05.

Results

The survey included 368 cancer patient, 194 (53%) of the respondents were male while 174(47%) were females. There was not much of difference in the education level between the two gender groups. More than half of patients were illiterate (54%) followed by (21%) who completed secondary school and (16%) completed primary school

Table 1. Baseline Demographics and Clinical Characteristics

Characteristics	No. of Patients (368)	Percentages
Gender		
Male/Female	194/174	52.7/47.3
Age Groups		
15-20 years	76	20.70%
21-30 years	82	22.30%
31-40 years	139	37.80%
41-50 years	71	19.30%
Marital Status		
Married	226	61.40%
Unmarried	142	38.60%
Type of Cancer		
Breast	93	25.30%
Head and Neck	89	24.20%
Gastrointestinal	47	12.80%
Lymphoma	44	12%
Acute leukemia	42	11.40%
Sarcoma	21	5.70%
Genitourinary	12	3.30%
Others	17	4.60%
Bone	3	0.80%
Education		
Illiterate	198	53.80%
Primary school	60	16.30%
Secondary school	76	20.70%
Intermediate	23	6.30%
Graduate	10	2.70%
Professional	1	0.30%

respectively. The distribution of patients according to age groups were 57% between 31 to 50 years and 43% between 15 to 30 years.

Among all respondents 226 (61%) patients were married while remaining 142 (39%) were unmarried. Frequency of respondents based on tumor biology were breast cancer (25%), head and neck cancer (24%), gastrointestinal cancer (13%), lymphoma (12%) and acute leukemia (11%) respectively. Overall 90% of respondents of either gender were not aware whether cancer or cancer treatment can cause infertility. Furthermore, 98% of males and 91% females wanted their primary oncologist to discuss fertility problems prior to initiation of treatment which was statistically significant ($P=0.005$). On further questioning it was observed that 92% males and 78% females wanted to consider fertility preservation techniques prior to initiation of cancer treatment which was also statistically significant ($P<0.0001$). Among 226 married individuals 89% males and 79% females were not aware whether infertility issue will effect on their relationship with their spouses. This association was near significance statistically ($P=0.06$). Age groups between 15-30 years, 93% patients were not aware whether cancer or cancer treatment causes infertility. And similarly 88% between age groups 31-50 years, which was near

Table 2. Gender

Questions	Male		Female		P Values
	Yes	Not aware	Yes	Not aware	
Can cancer cause infertility?	19	175	17	157	0.994
Does cancer treatment cause infertility?	19	175	17	157	0.994
Does chemotherapy cause infertility?	17	177	14	160	0.805
Do you want your oncologist to discuss this problem prior treatment?	190	4	159	15	0.005
Would you consider fertility preservation Techniques prior cancer treatment?	178	16	135	39	0.001
Are you aware of these techniques?	7	187	8	166	0.632
Would you like to delay cancer treatment and Opt for fertility preservation and Opt for fertility preservation?	21	173	20	154	0.839
Will this infertility issue have an effect on your relationship with your spouse?	12	92	25	95	0.062

Table 3. Age group

Questions	15-30 years		31-50 years		P Values
	Yes	Not aware	Yes	Not aware	
Can cancer cause infertility?	10	148	26	184	0.053
Does cancer treatment cause infertility?	11	147	25	185	0.114
Does chemotherapy cause infertility?	9	149	22	188	0.102
Do you want your oncologist to discuss this problem prior treatment?	149	9	200	10	0.688
Would you consider fertility preservation techniques prior cancer treatment?	143	15	170	40	0.011
Are you aware of these techniques?	3	155	12	198	0.67
Would you like to delay cancer treatment 13 & Opt for fertility preservation?		145	28	182	0.123
Will this infertility issue have an effect on your relationship with your spouse? 5		38	32	149	0.337

statistically significant (P=0.053). More than 90% among all age groups wanted to discuss FP prior to initiation of cancer treatment.

Between 15-30 years 91% and between 31-50 years 81% wanted to consider FP prior to cancer treatment with a near significant (P =0.011).

Discussion

Our study demonstrated that more than 90% of our young cancer patients were not aware about cancer or cancer treatment causing infertility. Similar fertility concerns regarding lack of information among cancer survivors were also observed in the previous study (Duffy et al 2005). However, about 70% young women diagnosed with cancer recalled having a discussion with their physician about fertility issues (Thewes et al., 2005). In another study, (Schover et al.,1999) only 57% of survivors recalled receiving information about risks of infertility from their cancer treatment.

Although we know that numerous factors have impact on fertility status and infertility cannot be predicted reliably; therefore, physicians and patients need to consider a potential cause for infertility without knowing

for sure. Similar to cause of confirmed infertility, potential for infertility can be a source of distress among patients (Knobf et al 2006 and Penrose et al 2012). As not all cancers or chemotherapeutic treatments affect fertility. Among males, fertility preservation should be offered in cases where high risk of azoospermia or DNA damage is suspected. Recent studies have concluded that the integrity of sperm DNA is compromised before initiation of treatment in patients with Hodgkin's lymphoma or testicular cancer (O'Flaherty et al., 2008 and Tempest et al., 2008). Testicular cancer itself is particularly injurious to fertility, since the growth factors produced by this malignancy can be deleterious to spermatogenesis. Most cytotoxic forms of chemotherapy are not tumor-specific and target rapidly dividing cell types indiscriminately. Similarly, spermatogenesis is extremely vulnerable to the damaging effects of systemic therapies, resulting in oligospermia or azoo-spermia (Arnon et al., 2001). Among females, the patient's age at treatment and the chemotherapy regimen (type and dose) both influence the risk of premature ovarian failure. Older women have a higher risk of presenting permanent infertility. It has been demonstrated that women younger than 40 years old exposed to chemotherapeutic agents have a 61%

risk of developing amenorrhea. Alkylating drugs like cyclophosphamide are the most gonadotoxic agents since they are not cell cycle-specific, and they also affect other cells in the ovary (Jensen et al 2011).

We observed that majority of patients in both genders wanted their primary physician to inform and discuss FP prior to initiating cancer treatment which was statistically significant. (Quin et al.,2009) reported that physicians felt that given the multitude of things that must be discussed related to cancer, and its treatment, specifically discussing FP in adult patients is considered to be low on the priority. Moreover, regardless of the perception of priority, some physicians believed that discussion on this topic causes more distress to the already distressed patients and would further heighten the patient or family member's anxiety levels (Quinn et al 2009). Cancer and its treatments vary in their likelihood of causing infertility. Individual factors such as disease, age, treatment type and dosages, and pretreatment fertility should be considered in counseling patients about their likelihood of infertility.

On further evaluating more than 90% males and 70% females would like to consider FP techniques prior to cancer treatment which is also statistically significant in our study. Most of cancer survivor prefer to have their own biological offsprings (Schover et al.,2002) even if they have concerns about birth defects that could be caused if the parent had cancer treatments before conception (Fossa et al., 2005).

It may be impossible for physicians to know how important fertility preservation is to their patients unless they ask them, since many patients may be ignorant. Patients who are interested in fertility preservation should consider their options as soon as possible to maximize the likelihood of success.

Discussion with reproductive specialists and review of available information from patient advocacy resources can facilitate decision-making and can mutually reinforce management plan. Among married patients on addressing the issue will treatment related infertility effect on their relationship, majority were uncertain about it. In few Western reports, many couples reported that their relationships grew stronger because of stressful infertility experiences (Golombok 1992). This was also pertinent to 50% of couples in (Greil et al.,1988) study and 68% reported that emotional support of their spouses had increased after learning about infertility. On the Contrary, (Wilkes et al., 2009) found that patients and their spouses often blamed their relationship or each other due to infertility, which resulted in emotional isolation, lack of communication and unpleasant arguments. Couples commonly reported communication problems and feeling of frustration with each other (Greil et al.,1988). In another study, 41% of female patients experienced an increase in conflicts with their partners (Sabestellin et al.,1988).

Fertility preservation is often possible in people undergoing treatment for cancer. Our study results though very pertinent but cannot be generalized as this is a single centre cross sectional study. But we know that broader application of fertility preservation methods is limited by several factors: Diversity in education status of the patients, lack of knowledge about the risk of infertility

with cancer and its treatments, failure to discuss and consider options before treatment, lack of insurance coverage for most procedures with consequent high costs, and many fertility preservation methods are in investigational stage. For patients at risk for infertility who are interested in evaluating their options for fertility preservation, referral to appropriate specialists as early as possible is recommended.

In conclusion, we recommend physicians and oncology care givers to initiate the discussion on the topic of cancer and Its treatment related infertility with young cancer patients as part of their initial management plan and also to guide the patients who need fertility preservation to infertility specialist centers.

Competing Interest

The authors declare that they have no competing interests.

References

- Arnon J, Meirrow D, Lewis-Roness H, et al (2001). Genetic and teratogenic effects of cancer treatments on gametes and embryos. *Hum Reprod Update*, **7**, 394-403.
- Carter J, Rowland K, Chi D, et al (2005). Gynecologic cancer treatment and the impact of cancer related infertility. *Gynecol Oncol*, **97**, 90-5.
- Clayton H, Quinn G, Lee J, et al (2008). Trends in clinical practice and nurses' attitudes about fertility preservation for pediatric patients with cancer. *Oncol Nurs Forum*, **35**, 1-7.
- Dellapasqua S, Colleoni M, Gelber RD, et al (2005). Adjuvant endocrine therapy for premenopausal women with early breast cancer. *J Clin Oncol*, **23**, 1736-50.
- Duffy CM, Allen SM, Clark MA (2005). Discussions regarding reproductive health for young women with breast cancer undergoing chemotherapy. *J Clin Oncol*, **23**, 766-73.
- Fossa SD, Magelssen H, Melve K, et al (2005) Parenthood in survivors after adulthood cancer and perinatal health in their offspring: A preliminary report. *J Natl Cancer Inst Monogr*, **34**, 77-82.
- Golombok S (1992). Psychological functioning in infertility patients. *Hum Pathol*, **7**, 208-12.
- Goodwin T, Oosterhuis B, Kiernan M, et al., (2007). Attitudes and practices of pediatric oncology providers regarding fertility issues. *Pediatr Blood Cancer*, **48**, 80-5.
- Greil AL, Leitko TA, Porter KL (1988). Infertility: His and hers. *Gen Soc*, **2**, 172-99.
- Jensen JR, Morbeck DE, Coddington CC III (2011). Fertility preservation. *Mayo Clin Proc*, **86**, 45-9.
- Knobf MT (2006). The influence of endocrine effects of adjuvant therapy on quality of life outcomes in younger breast cancer survivors. *Oncologist*, **11**, 96-110.
- Lee S, Schover L, Partridge A, et al (2006). American society of clinical oncology recommendations on fertility preservation in cancer patients. *J Clin Oncol*, **24**, 2917-31.
- Meirrow D, Nugent D (2001). The effects of radiotherapy and chemotherapy on female reproduction. *Hum Reprod Update* **7**, 535-43.
- O'Flaherty C, Vaisheva F, Hales BF, et al (2008). Characterization of sperm chromatin quality in testicular cancer and Hodgkin's lymphoma patients prior to chemotherapy. *Hum Reprod*, **23**, 1044-52.
- Penrose R, Beatty L, Mattiske J, Koczwara B (2012). Fertility and cancer-A qualitative study of Australian cancer

- survivors. *Support Care Cancer*, **20**, 1259–65.
- Quinn G, Vadaparampil S, King L, et al (2009). Impact of physicians' personal discomfort and patient prognosis on discussion of fertility preservation with young cancer patients. *Patient Educ Couns*, **77**, 338–43.
- Reebals J, Brown R, Buckner E (2006). Nurse practice issues regarding sperm banking in adolescent male cancer patients. *J Pediatr Oncol Nurs*, **23**, 182–8.
- Sabatelli RM, Meth RL, Gavazzi SM (1988). Factors mediating the adjustment to involuntary childlessness. *Fam Relat*, **37**, 338–43.
- Schover L, Rybicki L, Martin B, Bringelsen K (1999). Having children after cancer: a pilot survey of survivors' attitudes and experiences. *Cancer*, **86**, 697–709.
- Schover LR, Brey K, Lichtin A, et al (2002). Knowledge and experience regarding cancer, infertility, and sperm banking in younger male survivors. *J Clin Oncol*, **20**, 1880–89.
- Sonmezer M, Oktay K (2006). Fertility preservation in young women undergoing breast cancer therapy. *Oncologist*, **11**, 422–34.
- Tempest HG, Ko E, Chan P, et al (2008). Sperm aneuploidy frequencies analysed before and after chemotherapy in testicular cancer and Hodgkin's lymphoma patients. *Hum Reprod*, **23**, 251–8.
- Thewes B, Meiser B, Tayler A, et al (2005). Fertility- and menopause-related information needs of younger women with a diagnosis of early breast cancer. *J Clin Oncol*, **23**, 5155–65.
- Vadaparampil S, Quinn G, King F, et al (2008). Barriers to fertility preservation among pediatric oncologists. *Patient Educ Couns*, **72**, 402–10.
- Wilkes S, Hall N, Crosland A, et al (2009). Patient experience of infertility management in primary care: An in-depth interview study. *J Fam Pract*, **26**, 309–16.